COTTON FOR GERMAN AMMUNITION.

THE appointment of Mr. Lloyd George as Minister of Munitions is a sign that the reconstituted Government has at length realised the serious importance of ammunition in warfare. The complement of Mr. George's work will now surely be the exclusion of materials of ammunition from our enemies. It is now many months since Mr. Runciman, President of the Board of Trade, whose special mission was to deal with commerce with the enemy, was implored to place cotton and cotton goods on the list of contraband; it was urged that only by this course could the German troops be deprived of ammunition. But the attitude of mind which induced Mr. Runciman, some years ago, in criticising Lord Roberts' efforts to bring the nation to apprehend the danger which menaced us, to wish to "apologise to our good friends the Germans," appeared to have persisted. After much pressure, the Order in Council of March 14 was issued, apparently excluding cotton. The effect was nil. Cotton still poured into Germany, as appeared from returns chronicled in the *Times* of June 10, in answer to a Parliamentary question, where enormous increases in the exports of cotton and yarns into Sweden, Norway, Denmark, and the Netherlands in the figures for April, 1915, over those for April, 1914, were reported. Imports might have been stopped at once had cotton been declared contraband of war.

It is to be regarded as most unfortunate that Sir Edward Grey, in his letter to Dr. Page on January 14, gave the promise: "His Majesty's Government have never put cotton on the list of contraband; they have throughout the war kept it on the free list; and on every occasion, when questioned on the point, they have stated their intention of adhering to the practice." It is not going too far to say that this decision has, and will, cost Britain and her Allies many thousands of lives.

The supreme tragedy of this war is that while the patriotic and unselfish citizens of the Empire are risking all to save the world from German domination, our Government has been contributing to their destruction. To fight the enemy abroad is necessary, and calls for the utmost exertion of the manliest of our race; but to have to fight an enemy at home leads us to despair of victory. Even yet, cotton is entering Germany; and I learn from French sources that African wood ("ogoubi") and Norwegian wood pulp are being tried by the Germans as substitutes. These must all be declared contraband; that step, and that step alone, will deal a final blow to the enemy.

WILLIAM RAMSAY.

MR. F. H. NEVILLE, F.R.S.

BY the death, in his sixty-eighth year, of Mr. F. H. Neville, at Letchworth, on June 5, the scientific world, and metallurgists in particular, have to mourn the loss of a singularly gifted man and a most charming personality. Neville took his degree in the Mathematical Tripos of 1871, when he was bracketed fifteenth wrangler. He was elected a Fellow of Sidney Sussex College, Cambridge, in the same year. The bent of his mind was, however, in the direction of experimental science rather than mathematics, and early in 1880 he took over the management of the chemical laboratory at his college.

About 1888, the work of Raoult on the lowering of the freezing points of solutions was brought prominently into notice, and it occurred to Neville and Mr. C. T. Heycock to see if the same laws applied to metallic solutions. A first paper was read before the Chemical Society on June 3, 1889, on the lowering of the freezing point of tin by the addition of other metals, in which it was shown that, as regards a metal like tin, the effect of dissolving other metals was generally the same, so far as the freezing point was concerned, as in the case of aqueous and other solutions. After the first paper was published, more extended experiments were made, great trouble being caused by the rapid shift of zero of the mercury thermometers. With the assistance of Prof. Callendar and Principal E. H. Griffiths, Neville and Heycock were able to use the platinum resistance pyrometer, and from that time the thermal work was comparatively rapid and accurate. The investigations on alloys were continued with but slight intervals up to the autumn of last year, but by far the heaviest piece of work, both thermal and microscopical, was on the alloys of tin and copper; this formed the subject of the Bakerian Lecture.

In 1897 Neville was elected a Fellow of the Royal Society. No one knows better than the present writer how large a part Neville took in all the researches with which he was jointly associated, or how he could bring a mind trained in mathematical precision to bear on his scientific work. Only those who have dealt with the complex problems of alloys can appreciate the difficulty of disentangling the maze of experimental results and sifting out the good from the worthless, and so preventing the main problem from getting side-tracked.

Those who had the privilege of knowing Neville well were aware that he was a man of many gifts and wide reading—an excellent French, German, and Italian scholar, an authority on Italian history, and deeply interested in metaphysical speculations.

A more modest man, or one who had less push, in the worldly sense, it would be impossible to find. His death has left a deep gap, which his friends know well they will never be able to fill.

NOTES.

IN reply to a question asked in the House of Commons on June 14, it was announced that the Board of Trade had decided to dispense with the wool test for colour-blindness from January 1 next.

MR. J. B. TYRRELL, of Toronto, was elected president of the Geological Section of the Royal Society of Canada at its annual meeting held in Ottawa on May 25–27.

THE Institution of Mining Engineers has awarded its medal this year to Dr. J. S. Haldane, F.R.S., in recognition of his work on the causes of death in colliery explosions and other subjects connected with mines.

WE notice with much regret the announcement that Captain J. W. Jenkinson, late fellow of Exeter College, Oxford, and University lecturer in embryology, was killed on June 4 in the trenches in Gallipoli. He was forty-three years of age.

IT is announced in the issue of *Science* for May 28 that at its annual meeting, held on May 12, the American Academy of Arts and Sciences, acting upon the recommendation of the Rumford Committee, voted: "That the Rumford Premium be awarded by the Academy to Charles Greeley Abbott for his researches on solar radiation."

A JOINT meeting of the Aristotelian Society, the British Psychological Society, and the Mind Association will be held on July 3 and 5 next. On July 3 the meeting will take place at University College, Gower Street, London, W.C., when, at 6 p.m., the annual meeting of the Mind Association will be held. Prof. G. F. Stout will contribute a paper on Mr. Bertrand Russell's theory of judgment. On July 5 the meeting will be at 22 Albemarle Street, London, W. At 4 p.m. the annual meeting of the Aristotelian Society has been arranged, and at 5 p.m. there will be a symposium on the import of propositions, by Miss Constance Jones, Dr. Bernard Bosanquet, and Dr. F. C. S. Schiller.

WE referred in NATURE of June 3 to the forthcoming sale of Stonehenge by auction. The property is under the protection of the Ancient Monuments Act, which ensures its preservation; and the auctioneers, Messrs. Knight, Frank, and Rutley, 20 Hanover Square, W., announce that Sir Cosmo Antrobus, who is only tenant for life, proposes, if his powers permit him to do so, to impose conditions providing for the public having access thereto for all time. It is hoped, however, that Stonehenge may be bought either by the Government or by a learned society, and if any reasonable proposal be made for its acquisition with the intention of preserving the monument in the public interest, the auctioneers are instructed to facilitate a sale by private treaty before the auction.

IN NATURE of May 20 we announced the death of Prof. P. Zeeman, since 1902 professor of geometry and theoretical mechanics in the University of Leyden. Prof. Zeeman was born at Hoorn (Holland) in 1850, studied in Leyden, and in 1882 became professor of mathematics at the Polytechnic School (now Technical High School), Delft, where he remained until his appointment at Leyden. He was the author of many contributions to geometry, and an admirable teacher and examiner, who won the affection of all his pupils and colleagues. Prof. Zeeman, of Leyden, has been confused with Prof. P. Zeeman, of Amsterdam. It may, therefore, be worth mention here that the professor of physics of Amsterdam is much younger than his late Leyden colleague, being born in 1865, and no near relative of the latter. Prof. Zeeman of Amsterdam also studied at Leyden, and there discovered in 1896 the magnetic separation of the spectral lines which bears his name. In 1897 he became lecturer, in 1900 professor, at Amsterdam; and in 1908 he succeeded van der Waals as director of the Physical Laboratory.

WE record with much regret the death on June 15, at eighty-six years of age, of Sir Nathaniel Barnaby, K.C.B., honorary vice-president of the Institution of Naval Architects, and formerly Director of Naval Construction. From an obituary notice in Wednesday's *Times* we extract the following particulars of his career and work. Nathaniel Barnaby entered Sheerness Dockyard as a shipwright apprentice when fourteen years old, and in 1848 gained one of the scholarships thrown open to competition among his class by the Lords of the Admiralty. He passed through the Portsmouth School with distinction, and was appointed a draughtsman in the Royal Dockyard at Woolwich in 1852. He was afterwards transferred to the Constructive Department of the Admiralty as a draughtsman; and for thirty years he remained in that department, rising to be its head in 1870, when Sir Edward Reed resigned his position of Chief Constructor. In 1872 he was definitely appointed to the position of Chief Naval Architect, a title which in 1875 was changed to that of Director of Naval Construction. In this position he continued with eminent success until 1885, when overwork caused a serious failure of health, and he decided to retire from the public service, being succeeded by the late Sir William White. After his retirement from the public service Sir N. Barnaby took, naturally, a less active part in questions of naval construction than previously. He was, however, often seen at the meetings of the Institution of Naval Architects, of which he was one of the founders, and the Transactions of which contain a number of papers from his pen, from the first volume onwards. Sir N. Barnaby was also the writer of articles of a technical character for the "Encyclopædia Britannica," and of several books on shipbuilding and naval development. He leaves a married daughter and a son, Mr. Sydney Barnaby, who holds the position of technical director and naval constructor with Messrs. Thornycroft.

AT the anniversary meeting of the Linnean Society on May 29 the following officers were elected:—*President,* Prof. E. B. Poulton; *Treasurer,* Mr. Horace W. Monckton; *Secretaries,* Dr. B. Daydon Jackson, Dr. Otto Stapf, and Prof. E. A. Minchin; *Council,* Mrs. Agnes Arber, Mr. R. Assheton, Dr. W. T. Calman, Mr. A. D. Cotton, Sir Frank Crisp, Bart., Mr. J. Groves, Prof. D. T. Gwynne-Vaughan, Prof. W. A. Herdman, Dr. B. D. Jackson, Miss G. Lister, Prof. E. A. Minchin, Mr. H. W. Monckton, Dr. C. E. Moss, Prof. E. B. Poulton, Dr. A. B. Rendle, Mr. H. Scott, Prof. A. C. Seward, Dr. A. E. Shipley, Dr. Otto Stapf, and Comr. J. J. Walker, R.N. The Trail award and medal for 1915 were presented to Dr. Leonard Doncaster, and Sir George Reid, G.C.M.G., the High Commissioner for Australia, received the Linnean gold medal for transmission to Mr. J. H. Maiden, of Sydney, New South Wales. At the general meeting of the society on June 3, the president announced that he had appointed Mr. H. W. Monckton, Dr. A. B. Rendle, Prof. A. C. Seward, and Dr. A. E. Shipley vice-presidents for the ensuing year.

THE *Daily Chronicle* published on June 9 a long telegram from its New York correspondent, quoting from the New York *Tribune* the chief passages in a despatch from Mr. D. B. Macmillan, of Harvard University, the leader of the American expedition which has been at work to the north-west of Greenland since the summer of 1913. The main object of this expedition was to explore "Crocker Land," which Rear-Admiral Peary thought that he sighted from the north-west coast of Grant Land in 1906. The despatch now published was written a year ago, and the most important statement in it—that the appearance of land was seen in the direction indicated by Admiral Peary, but vanished as the explorers journeyed towards it, so that they concluded it was only a mirage—merely repeats information which was made known last winter through a despatch addressed to the American Museum of Natural History by Mr. W. E. Ekblaw, geologist and biologist to the expedition. Mr. Macmillan mentions that he has recovered records left behind by the Kane expedition and the Nares expedition. He also found in good condition milk and pemmican cached by Capt. Sverdrup twelve years ago. The work planned for this year included a journey by Mr. Macmillan himself for the exploration of the region south of the islands discovered by the Sverdrup expedition, and a journey by another party for the exploration of Greely Fiord and the Lake Hazen region in Grant Land.

THE death was recently announced of M. Pierre-Emile Martin in his ninety-first year. He was the first man to solve successfully the problem of making steel in an open-hearth furnace by melting pig-iron with iron oxide and scrap steel, his first patent being taken out in July, 1865. The actual discovery that steel could be made in this way was not new, for Réaumur had in 1722 carried out the same experiment, but only on a laboratory scale. Various metallurgists afterwards endeavoured to follow this method, but none of them were able to create a sufficiently high temperature in the melting hearth. M. Martin was the first to apply the principle of regenerative heating to his furnace, and in the early 'sixties he began experimenting with a Siemens furnace of one ton capacity at Sireuil in France. After numerous failures and disappointments, he at length succeeded in producing open-hearth steel of regular quality and composition, and his process was taken up by two of the leading French steel works. The success of the process attracted the attention of his competitors, and the validity of his patents was attacked on the strength of Réaumur's prior publication, although the latter had led to no practical result. Not having the financial means to defend the lawsuits brought against him, he was compelled, after two or three years, to give up the struggle and retire into private life, and for many years his existence was forgotten, although on the Continent the process was always associated with his name. A few years ago it became known that he was alive, and in June, 1910, at a banquet held in Paris, the steel-makers of Europe united to do him honour, and he was created by the French Government an Officer of the Legion of Honour. Ten days before his death the Bessemer medal awarded him by the council of the Iron and Steel Institute was handed to a representative of the French Embassy, who attended on his behalf at the spring meeting of the institute.

AT the shrine of the saint Sháh Daula at Gujrát in the Punjab the precincts of the building are occupied by a crowd of imbeciles who, from the elongated shape of their heads, are known as "Sháh Daula's Rats." Much interest has been shown in these curious creatures, and the question has been discussed whether this malformation is hereditary or artificial. In the June issue of *Man* Mr. M. Longworth Dames has collected references to the literature of the subject. From inquiries on the spot he finds them to be harmless, good-natured creatures possessing only primitive instincts and absolutely undeveloped minds. He concludes that the peculiar shape of their heads is the result of pressure applied by the mother that she may be able to devote her child to the saint to whom she owes the relief of her barrenness. He quotes an interesting account of such head-shaping from Mr. Bray's "Life History of a Brahui," and he believes, with good reason, that the practice is more common in Northern India than is commonly believed.

OF all the races of existing mankind, none is so interesting to the physical anthropologist as the Eskimo. No race possesses so many peculiar structural characters. In the last *Museum Bulletin* (No. 9, March 6, 1915) issued by the Canadian Department of Mines, Mr. F. H. S. Knowles directs attention to the peculiar form of the glenoid fossa and articular eminence in the skulls of Eskimo. The fossa is shallow, while the articular eminence is flattened and extended in a forward direction. The condition, in Mr. Knowles's opinion, is not unlike that seen in the skulls of Neanderthal man, and also, to a lesser degree, in the skulls of anthropoid apes. In most modern races of man, particularly in those living under the higher forms of civilisation, the glenoid fossa is deep and the articular eminence high and steep. Mr. Knowles seeks for an explanation of these contrasted forms of glenoid cavity in the nature of diet and in the movements of the lower jaw in mastication. As is well known, the diet of the Eskimo is particularly tough—the raw skin of whale, porpoise, and seal being looked upon as delicacies. Mr. Knowles regards the flattening of the articular eminence in the Eskimo, and also in Neanderthal man, as an adaptation to permit a free side-to-side movement of the jaw, such a movement being necessary for the proper mastication of tough substances.

WE have received from Mr. Johs. Schmidt a paper, printed in the *Comptes rendus des Travaux du Laboratoire de Carlsberg,* 1915, on the amount of lupulin in plants of the hop (*Humulus lupulus,* L.) raised by crossing. Detailed accounts of the crossing experiments are given, and the results are set out clearly in tabular form; 21 English, Danish, Austrian, and

German females, all cultivated plants, were crossed with wild Danish males, and the 744 resulting seedlings were investigated. Despite the fact that the wild males were presumably poor in lupulin, offspring variants having a higher lupulin percentage than the mother plant were produced. Improvement in this direction of higher lupulin content has thus been established, since the richest plants can be vegetatively propagated.

A PAPER of some interest on "The Influence of Temperature and Certain Other Factors upon the Rate of Development of the Eggs of Fishes," by A. C. Johansen and A. Krogh, has been published by the International Council for the Study of the Sea, as *Publication de Circonstance*, No. 68. By means of a specially designed thermostat the authors have kept the eggs of plaice and of cod at a series of different temperatures, and have recorded the time taken until the larva has reached a certain definite length. The main conclusion arrived at agrees with that reached previously by Dannevig, who had worked with less refined methods, namely, that the increase in rate of development with the temperature is proportional to the increase in temperature, or the curve expressing the relation between temperature and rate is a straight line. The authors have also studied the influence of low oxygen pressure upon the development of the eggs of plaice.

CAPT. S. A. WHITE, the President of the Australian Ornithologists' Union, is to be congratulated in having re-discovered a long-lost bird. This is the chestnut-breasted whiteface (*Aphelocephala pectoralis*), described originally from a single specimen by the late John Gould in 1871. Since then, all search for further specimens has proved unavailing, until Capt. White found it again, in small flocks, during an expedition to the Everard and Musgrave Ranges. Judging from the plumage of immature birds which he secured, he believes that this species interbreeds with the black-banded whiteface, which is highly probable, since the two species were often found in company. Capt. White gives an interesting account of his travels in the *Emu* for April. A camel-train furnished his means of transport, but throughout no small inconvenience was suffered by all the members of the expedition, including the camels, by reason of the prolonged drought, which, save for occasional and isolated showers, has now lasted for nine years in this region.

AN interesting article on the fur-bearing mammals of California, by Mr. H. C. Bryant, the game expert to the California Fish and Game Commission, appears in the April number of the new periodical, *California Fish and Game*. In a survey which dates back to 1786 the author traces the history of the ruthless and wasteful destruction of fur-bearing animals which has gone on without check until the present day. As a result some of the most valuable animals have been exterminated, while others are on the verge of extinction, a fate which can be averted only by instant and vigorous protective legislation. Among these is the sea-otter, which less than a hundred years ago was taken by the thousand; to-day no more than a few pairs are left. Some idea of the magnitude of the slaughter which is taking place may be gathered from the records of the total "catch" of last year in North America. This includes musk-rats 15,000,000, opossums 2,800,000, raccoons 2,400,000, skunks 2,152,000, minks 630,000, and "civet cats" (Bassaris) 500,000. To these must be added foxes, wolves, bears, otters, wolverines, pumas, wild cats, and martens, to the number of 1,500,000. Unhappily, the increased demand for furs is accompanied by a serious diminution in the area inhabited by the victims, owing to drainage and the destruction of forests. It is devoutly to be hoped that this appalling rate of destruction may be checked, at least, by the efforts which are being made to breed silver foxes and skunks for the sake of their skins. A number of "fur-farms" are already in a flourishing state, but so far their output is not sufficient to diminish materially the toll levied on the wild animals.

THE acid secreted by the gram plant, *Cicer arietinum*, forms the subject of Bulletin No. 45 of the Agricultural Research Institute, Pusa, and has been investigated by Mr. D. L. Sahasrabuddhe. The secretion which is used as a medicine in Western India has been found to consist of a mixture of malic and oxalic acids in the proportion of 94 per cent. of the former and 6 per cent. of the latter, and the secretion appears to be produced by the glandular hairs which occur especially upon the pods. The acids are collected by drawing a damped cloth over the gram plants and then wringing it into an earthenware vessel, and during the ninth to the eighteenth week of the plant's growth the yield of malic acid for an acre of gram was found to be 2686 gm., the cost of collection being about 14 rupees.

THE twisted fibres of the chir pine (*Pinus longifolia*, Roxb.) again forms the subject of an article in the *Indian Forester*. In the number for April (No. 4, vol. xli.) Mr. F. Canning deals with the matter as regards the east of Almora district. Twisting both left-handed and right-handed is found, and a very large proportion of trees are affected. At the base the twist is usually slight, and it becomes worse and worse higher up the stem, the maximum angle noted being 45° from the vertical. As to the distribution of affected trees, the relation to the geological conditions has not been observed, but aspect, fire, and proximity to villages do not appear to be correlated in any way with the occurrence of twist. Owing to the difficulty of detecting twisted trees in the young state, it may not be practicable to try to eliminate twisted fibre specimens in a sapling forest, though such trees are of very little value except for firewood.

THE Salton Sea in the Cahuilla Basin of California is described and illustrated by Mr. D. T. MacDougal in the *American Journal of Science* (vol. xxxix., p. 231). The work published by the Carnegie Institution was reviewed in NATURE (vol. xciv., p. 434, December 17, 1914), and this shorter account will be convenient for many who have not access to the publications of the institution.

Mr. H. P. Cushing (*American Journal of Science*, vol. xxxix., p. 288) criticises the view of Prof. W. J. Miller that the syenites and granites of the Adirondack region belong to one vast intrusive body, and maintains that here, as in Canada, there is an older group of orthogneisses which is intruded into the Grenville Series. This group has suffered severe regional metamorphism, and has been invaded by later rocks of the anorthosite-syenite group. The older orthogneisses may therefore be styled Laurentian, as in Canada.

The expedition of Mr. F. B. Loomis from Amherst College to Patagonia resulted in his discovery, published in 1914, that Pyrotherium was a proboscidean. He referred the beds in which it occurred to the Oligocene. Mr. Carlos Ameghino ("Boletin de la Sociedad Physis," vol. i., p. 446, Buenos Aires, 1914) states that certain white sandy clays underlying the Pyrotherium beds, and recognised by Loomis as Cretaceous, are the strata that contain Notostylops, Notopithecus, and other mammals. Ameghino accepts a Cretaceous age for these, and believes that Pyrotherium is an early Eocene form. If this were proved, the ancestry of the proboscideans is to be sought, as Ameghino urges, in S. America rather than in Africa.

The paper entitled "The Microspectroscope in Mineralogy," by Mr. Edgar T. Wherry, assistant curator of the division of mineralogy and petrology in the U.S. National Museum, which forms No. 5 of vol. lxv. of the Smithsonian Miscellaneous Collection, constitutes an important contribution to our knowledge of the absorptive properties of minerals. So long ago as 1866 Sir Arthur Church first noticed the existence of an absorption spectrum in zircon, but hitherto no systematic study has been made of the subject. Mr. Wherry has examined specimens of about two hundred minerals, and the results of his investigation are carefully tabulated. The analytical key given at the end of the paper should be invaluable to those making use of the method for determinative purposes. He found that better results were afforded by light diffused from the specimen than by light transmitted through it. The beautiful violet calcite from Joplin gives the neodymium absorption spectrum, and so do the yellow sphene from Switzerland and the brown apatite from Ontario. It is unexpected to learn that the colour of the violet-red almandine garnet is apparently due to vanadium. The presence of magnesium and manganese has no effect upon the colour of garnet. The bands shown by zircon are due to the presence of uranous uranium, usually in amounts of less than 0·5 per cent. The resulting blue colour is often masked by the other agents, such as iron or manganese. Brown or white zircons do not show a spectrum.

Symons's Meteorological Magazine for May gives the diurnal range of rainfall at Karlsruhe (Baden) and at Petrograd. The results have been obtained by Henrik Renqvist, Helsingfors, for the summer months June, July, and August from the published hourly values of rainfall. For Karlsruhe the observations dealt with are for twenty-two consecutive years, from 1892 to 1913 inclusive. Percentages of the total fall are given for each interval of four hours. The highest percentage value is 22·0 for 4 to 8 p.m., and the lowest 12·2 for 8 a.m. to noon. The results for Petrograd are for the twelve years 1897 to 1908, and have been dealt with in the same way. The highest percentage is 22·3 for noon to 4 p.m., and the lowest 13·3 for 4 to 8 a.m. Both stations are fair representatives of the Continental type, and show a maximum in the afternoon and a minimum in the morning. Karlsruhe is said to have a diurnal range of rainfall highly resembling that of Perpignan, for which the percentages are given. Petrograd shows great similarity to Kew, the results for which are given from "The Diurnal Range of Rain," issued by the Meteorological Council.

The *Journal of Agricultural Research*, iii., 5 (Washington), is scarcely the place in which one would expect to find a paper on fitting logarithmic curves by the method of moments. The use of logarithmic curves would appear to be desirable for tabulating biological statistics, and the object of the paper is to determine the constants when the formula assumed is of the form of a quadratic function plus a logarithm. Mr. John Rice Miner determines these constants in terms of the area and first two or three moments of the curve, but unfortunately the formulæ are very laborious in the carrying out, and it would certainly appear desirable to simplify them.

The Journal of the Washington Academy of Sciences for May 19 contains a short account of a new calorimeter due to Messrs. H. C. Dickinson and N. S. Osborne, of the Bureau of Standards. The calorimetric substance is a block of copper in which are embedded a platinum resistance thermometer and a coil of resistance wire for supplying heat to the block electrically. A number of test experiments on the specific heat of water show that a degree of accuracy of 1 part in 2000 may be obtained with the calorimeter. The specific heat between −40° C. and 0° C. and the latent of fusion of ice at 0° C. have also been determined with the apparatus. The results for the specific heat are given by the expression $0{\cdot}5057+0{\cdot}00186\theta$, where θ is the temperature Centigrade, and for the latent heat 79·76 in terms of the gram-calorie at 20° C. The latter figure is in close agreement with the value 79·74 previously obtained at the Bureau by other methods, so that it seems probable that the mean 79·75 may be accepted as a close approximation to the true value of this important constant.

M. Ernest Coustet contributes to *La Nature* of May 22 a useful article on the dosage of X-rays. He admits that the mere observation of the current traversing the X-ray tube is apt to be very misleading. Better results are given by comparing the fluorescence produced by the rays with the fluorescence produced by a radium bromide standard. This method implies a careful observation of the time of exposure, a necessity which is avoided by the various "chromometers" devised by Holzknecht, Bordier, Sabouraud, and Noiré, in which the dose is estimated by the coloration of sodium chloride or bromide, or of barium platinocyanide. Since, however, the estimation of tints does not admit of any great accuracy, some ionisation method appears preferable, such as is employed in Villard's X-ray counter, in which an electroscope is discharged a number of times. It then remains to measure the "hardness" of the rays, or their penetrating power, and this may be done by Benoist's "radiochromometer," consisting of a ring of aluminium strips of twelve different thicknesses. There is still, however, much room for improved methods of dosage.

MR. JAMES KEITH directs attention in the *Engineer* for June 11 to the use of cast-iron shells of fairly large calibre by the Germans. Mr. Keith suggests that, whether or not there be any particular reason for our keeping to expensive steel shells, there could surely be no harm in our having cast-iron ones as well to fill up the gaps, and so enable innumerable shells to be at the service of the armies of the Allies. The matter is taken up by our contemporary in a leading article, and the objections to the course suggested by Mr. Keith are discussed fully. In shrapnel cast-iron shells, the number of bullets is reduced because the walls of the shell must be made much thicker. In high-explosive shells there is such danger of a cast-iron shell developing cracks during manufacture that high explosives cannot safely be used in them. Further, projectiles must be perfectly in balance; the walls must be of uniform thickness all round, and must be of homogeneous material. Otherwise accuracy in shooting would be destroyed. Lastly, the methods of manufacture of steel shell have been so developed that such shell can actually be turned out more quickly than those of cast-iron of equal trustworthiness and accuracy. An 18-pounder shell can be completely machined from the bar in about forty minutes. The *Engineer* suggests that the use of cast-iron by the Germans indicates that they are finding their supplies of modern projectiles not inexhaustible under the tremendous drain that is being put upon them.

MESSRS. LONGMANS AND CO. announce for early publication "The House Fly: a Slayer of Men," by F. W. Fitzsimons, director of the Port Elizabeth Museum. The volume will be illustrated. The author has worked for several years at the destruction of the house-fly in South Africa.

OUR ASTRONOMICAL COLUMN.

BEHAVIOUR OF SPECTRUM LINES OF THE SAME SERIES.—The lines in a series are generally assumed to behave alike (omitting reversals), even under varying experimental conditions. In fact, their sharpness, diffuseness, or direction of unsymmetrical widening have been used as criteria in the detection of series relationships. Thus if the strong lines of a series were unsymmetrically widened towards the red the remaining lines of the series would be expected to be widened in the same direction. This, however, is not the case, and an investigation bearing on these points is communicated by Dr. Royds to the forty-third Bulletin of the Kodaikanal Observatory (see also the *Astrophysical Journal,* March, vol. xli., No. 2, p. 155). In the case of the barium lines he finds that all the first members of the first subordinate series are displaced to the red, and the second members to the violet. In the case of the calcium series he finds this not so extreme a case as that of barium, but still a noteworthy exception to the general run of series. The strontium series, on the other hand, is stated to be quite normal if the infra-red lines the character of which is unknown are excepted. Dr. Royds directs attention to the whole question of the relationship between pressure shifts and series, since the pressure shift may even be in opposite directions for lines of the same series. He points out, further, the importance of isolating the pressure effect from the density effect, the elimination of the latter in order to obtain true pressure shifts being "one of the most pressing problems for those interested in the displacements in the sun's spectrum."

THE FISHER, POLK COUNTY, MINNESOTA, METEORITE.—In the *American Geologist* for December, 1894, brief mention was made of the finding near Fisher, Polk County, Minnesota, of a meteoric stone weighing nine and a half pounds. This stone, the first found within the State limits, was assumed to be a representative of a reported fall which took place on the 9th of the preceding April. In a subsequent number of the *Geologist* a petrographic description of the stone was begun by Prof. N. H. Winchell, but this was neither completed nor was a satisfactory chemical analysis made. In view of these facts and also because more parts have been subsequently found, a complete review of the whole matter has been undertaken by Prof. G. P. Merrill, and the results are published in No. 2084 Proceedings of the United States National Museum (vol. xlviii., pp. 503–6, May, 1915). It seems that specimens of this fall are distributed in eight different collections, the four largest portions being in institutions in Minneapolis, Washington, New York, and Hamburg; the total weight of all the known portions amounts to 9900 grams. The author has been offered facilities for examining and taking samples for the purposes of identification and chemical analysis, and in this paper he publishes the results of his inquiry. Following Brezina's classification he places the stone in the group of intermediate chrondites Ci, or perhaps Cia, as one cut surface shows a small thread-like black vein.

THE NANTUCKET MARIA MITCHELL ASSOCIATION.—In the thirteenth annual report of the Nantucket Maria Mitchell Association, an account is given of the astronomical work accomplished during the past year. This association completed in 1911 the Astronomical Fellowship Endowment Fund, and the first fellow was appointed in the following year; the second has just been nominated. This fellowship enables the holder to avail herself of the entire year for study and research in an observatory of her own selection. Miss Annie J. Cannon, the chairman of this special committee, describes briefly the work of the association with the new 7½ in. photographic telescope. After the adjustments were completed numerous photographs were taken, chief of which were of the minor planet Eros. These plates are now being measured by the first fellow, Miss Harwood, at the Harvard Observatory, together with the plates of the same asteroid taken at that observatory. The chief research will be the photographing of each asteroid once a month for as long a period as possible, the selected objects being those for which the ephemeris at opposition is given in the Berlin *Jahrbuch.*

RECENT BULLETINS OF THE ASTRONOMICAL SOCIETY OF FRANCE.—The April and May numbers of the valuable Bulletin of the Astronomical Society of France have come to hand in spite of the difficulties under which